

12) p 205
Quad Function
zeros 1 and -3
passes through (2, 10)
write in Vertex Form

1) Factored $f(x) = a(x-s)(x-t)$
 $10 = a(2-1)(2+3)$
 $10 = a(2)(5)$
 $10 = 10a$
 $a = 2$

2) Factored $f(x) = a(x-s)(x-t)$
 $f(x) = 2(x-1)(x+3)$
 $\frac{s+t}{2} = \frac{-1+3}{2} = \frac{2}{2} = 1$
 $\frac{s-t}{2} = \frac{-1-3}{2} = \frac{-4}{2} = -2$
 $(h, k) = (1, -8)$
 $f(x) = a(x-h)^2 + k$
 $f(x) = 2(x+2)^2 - 8$
 $y = a(x-h)^2 + k$

Oct 20-9:32 AM

Functions 3 Forms

- 1) Standard $ax^2 + bx + c = 0$
 2) Vertex $f(x) = a(x-h)^2 + k$
 3) Factored $f(x) = a(x-s)(x-t)$

Standard to Vertex Form

Completing the Square

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$(a+b)^2 = a^2 + 2ab + b^2$
 (a+b)(a+b) last term is a perfect square
 middle term is 2ab

$(x+9)^2 \Rightarrow x^2 + 18x + 81$
 $(x-3)^2 \Rightarrow x^2 - 6x + 9$
 $(2x+5)^2 \Rightarrow 4x^2 + 20x + 25$
 $(x+4)^2 \Rightarrow x^2 + 8x + 16$

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a) $f(x) = x^2 + 8x - 9$ $\left(\frac{b}{2}\right)^2$
 $f(x) = x^2 + 8x + 16 - 16 - 9$
 $f(x) = (x+4)^2 - 16 - 9$
 $f(x) = (x+4)^2 - 25$
 $(-4, -25)$
 h k

h k it
square it
add it up
take it off

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$f(x) = x^2 - 6x - 14$ $\left(\frac{6}{2}\right)^2$
 $f(x) = x^2 - 6x + 9 - 9 - 14$
 $f(x) = (x-3)^2 - 9 - 14$
 $f(x) = (x-3)^2 - 23$
 $(3, -23)$
 h k

$\left(\frac{6}{2}\right)^2$
 3^2
 $= 9$

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$f(x) = x^2 - 4x + 9$ $\frac{4}{2^2}$
 $f(x) = x^2 - 4x + 4 - 4 + 9$
 $f(x) = (x-2)^2 - 4 + 9$
 $f(x) = (x-2)^2 + 5$
 $(2, 5)$
 h k

$\frac{4}{2^2}$
 $= 2$
 $= 4$

Oct 20-10:08 AM

$$\begin{aligned}
 f(x) &= 2x^2 + 20x + 5 \\
 f(x) &= 2(x^2 + 10x) + 5 && \text{Partial Factoring} \\
 f(x) &= 2(x^2 + 10x + 25 - 25) + 5 \\
 f(x) &= 2(x+5)^2 - 25 + 5 \\
 f(x) &= 2(x+5)^2 - 50 + 5 \\
 f(x) &= 2(x+5)^2 - 45 \\
 &\quad (-5, -45) \\
 &\quad \quad \quad \begin{matrix} h & k \end{matrix}
 \end{aligned}$$

Mar 26-1:01 PM

$$\begin{aligned}
 f(x) &= -x^2 + 6x + 7 \\
 f(x) &= -(x^2 - 6x) + 7 \\
 f(x) &= -(x^2 - 6x + 9 - 9) + 7 \\
 f(x) &= -[(x-3)^2 - 9] + 7 \\
 f(x) &= -(x-3)^2 + 9 + 7 \\
 f(x) &= -(x-3)^2 + 16
 \end{aligned}$$

Oct 10-10:43 AM

$$\begin{aligned}
 f(x) &= -3x^2 + 6x - 7 \\
 f(x) &= -3(x^2 - 2x) - 7 && \left(\frac{b}{2}\right)^2 \\
 f(x) &= -3(x^2 - 2x + 1 - 1) - 7 \\
 f(x) &= -3(x-1)^2 - 1 - 7 \\
 f(x) &= -3(x-1)^2 + 3 - 7 \\
 f(x) &= -3(x-1)^2 - 4 \\
 &\quad (1, -4)
 \end{aligned}$$

Mar 10-10:18 AM

$$\begin{aligned}
 f(x) &= -3x^2 + 15x - 2 \\
 f(x) &= -3(x^2 - 5x) - 2 \\
 f(x) &= -3\left[x^2 - 5x + \frac{25}{4} - \frac{25}{4}\right] - 2 && \left(\frac{5}{2}\right)^2 = \frac{25}{4} \\
 &\quad \frac{5}{2} \times \frac{5}{2} \\
 f(x) &= -3\left(x - \frac{5}{2}\right)^2 - \frac{25}{4} - 2 \\
 f(x) &= -3\left(x - \frac{5}{2}\right)^2 + \frac{75}{4} - 2 \\
 f(x) &= -3\left(x - \frac{5}{2}\right)^2 + \frac{75}{4} - \frac{8}{4} \\
 f(x) &= -3\left(x - \frac{5}{2}\right)^2 + \frac{67}{4} \\
 &\quad \left(\frac{5}{2}, \frac{67}{4}\right)
 \end{aligned}$$

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$$\begin{aligned}
 f(x) &= -2x^2 + 16x - 9 \\
 f(x) &= -2(x^2 - 8x) - 9 && \left(\frac{8}{2}\right)^2 \\
 &\quad \quad \quad (4)^2 \\
 f(x) &= -2(x^2 - 8x + 16 - 16) - 9 \\
 f(x) &= -2[(x-4)^2 - 16] - 9 \\
 f(x) &= -2(x-4)^2 + 32 - 9 \\
 f(x) &= -2(x-4)^2 + 23 \\
 &\quad (4, 23)
 \end{aligned}$$

Oct 18-9:01 AM

$$\begin{aligned}
 f(x) &= -3x^2 + 24x - 12 \\
 f(x) &= -3(x^2 - 8x) - 12 \\
 f(x) &= -3[x^2 - 8x + 16 - 16] - 12 && \left(\frac{8}{2}\right)^2 = 16 \\
 f(x) &= -3(x-4)^2 - 16 - 12 \\
 f(x) &= -3(x-4)^2 + 48 - 12 \\
 f(x) &= -3(x-4)^2 + 36 \\
 &\quad (4, 36)
 \end{aligned}$$

Mar 26-1:09 PM

Hmk

P 214 q. 3, 4, 6 & 8

$$y = (x - 3)^2 - 23$$

(3, -23)

$$y = a(x - h)^2 + k$$

$$(x + 4)^2 - 22$$

(h, k)

(-4, -22)

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$$f(x) = -x^2 - 6x - 14$$

$$f(x) = -1(x^2 + 6x) - 14$$

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